Printed-Wiring Board (PWB) Supplier Questionnaire

DOCUMENT IDENTIFIER: A-SP-ELMF088-00-0000 Rev B1, 07-Dec-1990

ABSTRACT: This questionnaire is used by the Digital Qualification Team to gather information used to qualify a potential printed-wiring board supplier.

APPLICABILITY: This questionnaire supports the qualification procedure specified by DEC STD 088-0 Qualification Procedure for All Printed-Wiring Board Suppliers.

STATUS: APPROVED 07-Dec-1990; use VTX SMC for current status.

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APPROVAL: This document has been reviewed and recommended for approval by the General Review group for its category and the DEC STD 088 Advisory Committee.)

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Use $ VTX ELF for the latest location information.

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GENERAL INFORMATION

Company name:

_____

Street address:

_____

City:

_____

State:

_____

Zip code:

_____

Phone: ( )

Date:

_____

TWX:

_____

FAX:

_____

Prepared by:

_____

Department:

_____

Title: Phone ext.:

_____

NOTE

The following information must be submitted with this survey:

1. **Last two (2) years Annual Report, Equipment/Facilities List, Quality Manual, Product Literature, and any additional information that may help.**
2. **A complete management and supervisory organization chart with length of service in company.**

1 GENERAL INFORMATION

1.1 PLANT DATA

1. How many years have you been producing Printed-Wiring Boards (PWBs)?

   _____

2. How many total square feet is the plant?

   _____

3. Total manufacturing area?

   _____

   Total administrative area?

4. Is the building owned?

   _____

   Leased?

   _____

5. Lease expiration date?

   _____

6. Age of building?

   _____

   Type of construction?

   _____

7. Total number of employees?

   _____

   Number of shifts?

   _____

8. Hours per Shift?

   _____

   Days per Week?

   _____

9. Number of Production Employees?

   _____

10. Number of engineering employees?

_____

Number of manufacturing engineers.

_____

Number of lab. technicians.

_____

Number of process technicians

_____

Number of planning engineers/technicians

_____

Define the number of programmers and photo technicians

_____

11. Total number of Quality employees.

_____

Number of inspectors.

_____

Number of operators.

_____

Number of technicians.

_____

Number of quality engineers.

_____

Number of auditors.

_____

Number of supervisors.

_____

12. Total number of research and development employees.

_____

13. Total number of administrative employees.

_____

14. Total number of others?

    _____

15. Are you a minority/women owned business?

    _____

16. Please comment on your Equal Employment Opportunity (EEO) or equivalent program compliance (if applicable).

    _____

17. Please comment on your Occupation Safety and Health Agency (OSHA) or equivalent regulatory program compliance.

    _____

18. Please comment on your Environmental Protection Agency (EPA) or equivalent regulatory program compliance.

    _____

19. Do you support small lot engineering prototype activity?

A.	Research	Yes ——-	No ——-
B.	Manufacturability	Yes ——-	No ——-
C.	Prototype Build	Yes ——	No ——

20. Please provide the following information about your prototype capability.

1.	Min. Lead Time	D/S ——- M/L ——-
2.	Max. Lot Size	————————-
3.	Total Capacity Sq Ft/Day	————————-
4.	Separate Prototype Line	Yes ——- No ———

21. Do you offer QTA production volume service?

    Yes ———————— No ————————

If yes,	
Lead Time	D/S ——- M/L ——-
Max. Lot Size	————————
PCT. Prod. Allocated to QTA	————————
QTA. and Volume Line Separated	Yes —— No ——

22. What is total volume capacity in SQ FT/DAY?

    D/S ————— M/L —————

23. Delivery Performance:

    Digital criteria for supplier ship performance is whole lots shipped 100% ± 1 day to your commitment.

What has been your average ship performance based on above criteria over the last year?

_____-

24. Does your "quick turn" delivery cycle differ dependent on circuit complexity?

_____

How much, if any?

_____

25. Do all tools paid for by Digital become Digital property? If not, are there any conditions for removal?

_____-

26. Does your company have a cancellation policy?

_____-

If so, what are the terms and conditions?

_____-

27. Are there in-house toolmaking/maintenance facilities?

_____

28. What is your current lead-time for production volumes for D/S ———— M/L ————
29. What is your internal cycle time for D/S ———— M/L ————
30. Do you have active program to reduce internal cycle time?

_____-

If so, indicate short and long term goals.

_____

_____

31. Export:

Do you export products? If so, to what countries.

_____

32. Are you planning any capacity increase within the next 6 months, 12 months or 24 months? If yes, please specify increases. How will capacity increase affect the product mix?

Current	6 months	12 months	24 months

33. What are you plans to support higher technologies?

_____-

34. What new capital equipment do you plan to purchase? When?

    _____-

35. What other factors would limit your growth?

    _____-

36. Has your company worked for Digital Equipment Corporation in the past?

    _____-

    If yes, please explain and list Digital contact?

    _____

37. Briefly describe your Customer Service Program. (For example, organization and response time)

    _____

    _____

    _____

    _____

2 FINANCIAL DATA/HISTORY

Please supply your last two (2) Annual Reports with this questionnaire.

**If the financial data is not available to Digital, please explain.

1. Ownership:

   Privately held?

   _____

   Publicly held?

   _____

2. Sales for the last four (4) fiscal years?

   19 19 19 19

3. Projected percentage (%) sales increase currently and for the next three (3) years.

   19 19 19 19

4. List your top four (4) customers according to percentage (%) share of your gross sales and plant capacity?

Name	Industry Type	% Gross Sales	% Capacity	Years with Your Company?	Can They be contacted?

   1. _____
   2. _____
   3. _____
   4. _____
   5. How many active customers do you have?

      _____

   6. What are your sales terms for tooling, manufactured parts, and FOB point?

      Tooling?

      _____

      Manufacturing parts?

      _____

      FOB point?

      _____

7. What percentage (%) of your business is military, computer or aerospace, or telecommunications?

   Military

   _____

   Computer

   _____

   Aerospace

   _____

   Telecommunications

   _____

8. On an average, over an extended period of time, what percentage of your business would you commit to Digital before you become concerned?

   Percentage (%)

   _____

   In U.S. dollars ($)

   _____

9. What is your equipment replacement/refurbishment criteria? Please explain.

   _____

10. What are your future expansion plans in terms of U.S. dollars ($)?

    _____

11. Do you subcontract any portion of your business? If yes, what Process(es)?

    _____

12. What is your present/average raw material inventory, number of weeks supply?

    _____

13. Do you have the capability to inventory one or two months of Digital's requirements to protect against a potential material shortage?

    _____

14. Do you have the raw material in consignment inventory?

    _____

15. Would you hold finished goods in inventory at your expense to ensure delivery commitments are met? Comment:

_____

3 PROCESS DATA

1. Please attach your current UL yellow card status.

_____

2. What is your current IPC status?

_____

3. What is your current Mil-P-55110 status?

_____

4. What are your technology migration plans? (Express percentage of total production)

	Current Yr ____	FY	FY	FY	FY
Layer count					
Flex Circuits	_____	___	___	___	___
Single Sided	_____	___	___	___	___
D/S	_____	___	___	___	___
4L	_____	___	___	___	___
6-8L	_____	___	___	___	___
9-12L	_____	___	___	___	___
> 14L	_____	___	___	___	___
TOTAL	100%	100%	100%	100%	100%
Characteristics					
Backplane	_____	___	___	___	___
SMT	_____	___	___	___	___
Controlled IMP	_____	___	___	___	___
Controlled CA	_____	___	___	___	___
SMOBC	_____	___	___	___	___
All Copper	_____	___	___	___	___

5. What is the maximum panel size your shop can process?

_____

Finish?

_____

Finish?

_____

Length X width (inches or metric)

_____

6. What is your normal panel size? (length X width)

_____

7. What is your normal lot size?

_____

8. What is your smallest lot size?

_____

9. Do you have written process standards? Are they posted?

_____

10. Do you have a separate research and development process line?

_____

11. Do you have (automated) on-line shop floor control/MRP systems?

_____

12. Does a manufacturing package of specifications and drawings accompany each lot?

_____

If yes, how are ECOs/revisions managed?

_____

13. Are customer changes reviewed before implementation? Please comment.

_____

14. Is process history reviewed by engineering to implement process changes?

_____

15. Is the customer notified of recommended/suggested changes for comments or approval?

_____

16. How often is lot/part number expedited and the data posted?

_____

17. How often is job status updated/reported?

_____

18. Is this data supplied to customers on a regular basis?

_____

If yes, how regular?

_____

19. List the manufacturing data you require from your customers?

_____

20. How many copies are required?

_____

21. In what form do you prefer the data to be supplied? Please be specific.

_____

22. Do you have capabilities to receive data via a modem?

_____

23. Is this data verified? Please comment on how it is verified.

_____

24. Is any repair/rework performed on manufactured parts?

_____

25. On the average, what is the normal percentage (%) of repair/rework for this facility?

_____

26. Do you care to comment on any issues that Digital may have over-looked that will improve your qualification status?

_____

4 TECHNOLOGY

1. What is the minimum line width/spacing you can build in volume?

   _____

   Width X space.

   _____

2. What is the tolerance you normally hold on this width?

   _____

3. What is your standard/average line width spacing you build in volume?

   _____

   Width X space

   _____

4. What is the tolerance you can hold on this width?

   _____

5. What is the maximum number of layers that you have built?

   _____

   In volume?

   _____

6. What is the maximum board thickness you can build in volume?

   _____

7. What is the maximum pattern density you can build in volume?

   _____

   What grid?

   _____

8. What is your minimum drilled hole size? unplated _____ plated _____

   _____

9. What is the maximum aspect ratio you can produce?

   _____

   In small quantities _____ hole size _____ board thickness _____
   In volume _____ hole size _____ board thickness _____

10. Do you, or have you built boards with any of the following materials? And do you have UL approval on any built boards?
yes ____ no ____

Material	UL Approval
Planar Resistor Layers	_____
BT	_____
Kevlar	_____
Quartz	_____
Teflon	_____
Polyimide	_____
Any other materials?	_____

11. What surface mount technology (SMT) centerline pitch have you built?

_____

12. What SMT pitch/grid can you electrically test?

_____

Can you simultaneous double side test?

_____

13. What is the flatness tolerance you can hold for SMT?

_____

14. Do you have an X-ray fluorescence machine? Which one?

_____

15. Is tin - lead reflow normally used? Which reflow system?

_____

16. Have you built controlled impedance boards?

_____

Controlled capacitance?

_____

Microstrip boards? If yes, how many layers?

_____

What impedances?

_____

17. Do you have a TDR?

_____

Hi-Pot?

_____

Four Wire Kelvin?

_____

Capacitance Meter?

_____

18. Do you build?

Blind Vias? If yes, describe product.

_____

Buried Vias? If yes, describe product.

_____

Sizes?

_____

19. Do you have any clean rooms? What class?

_____

20. Do you have a laser plotter?

_____

What type?

_____

What pixel size?

_____

21. Do you do soldermask over bare copper?

_____

22. What liquid photo-imageable soldermasks do you use?

_____

What dry film soldermasks do you use?

_____

23. What photo-imaging equipment do you use?

_____

24. Are the same holes used for all processing?

_____

25. Do you have vacuum lamination capabilities?

_____

What equipment?

_____

26. Is hole cleaning performed?

_____

If yes, what system is used?

_____

27. How is hole cleanliness verified on internal lands?

_____

28. Is there any automated optical-inspection equipment used?

_____

If yes, what equipment?

_____

Is it used before etching?

_____

After etching?

_____

For internal layers?

_____

Final inspection?

_____

Other?

_____

29. Comment on Laboratory facilities which are used for support work?

For example, do you use Scanning Electron Microscope (SEM), Atomic Absorption (AA), and Infrared spectrophotometer?

_____

30. What technical support is available to Digital if necessary?

_____

31. Would you commit to develop new processes/materials?

_____

32. Do you have additive copper processing capabilities? If yes, define method used.

_____

5 QUALITY

1. Does the supplier have documented quality policies and procedures? If yes, include a listing of the policies/procedures with current revision levels and source where they can be reviewed.

   _____

2. Are the policies documented as a part of an overall business strategy or plan?

   _____

3. Is there an overall quality organization? Include Organization Chart.

   _____

4. Manager's name?

   _____

   Title:

   _____

5. Is there a manufacturing process flow chart? If so, include state and the manufacturing locations to which this chart pertains.

   _____

   Does it include inspection stations?

   _____

6. Are the procedures documented for all process test and audit steps?
   Show an example.

   _____

7. Is there a procedure for control and distribution of new and revised documentation, both internal and external?
   It so, include.

   _____

8. Is there a documented procedure and plan for control of raw material quality from sub-suppliers?
   If so, include.

   _____

9. Are specific and documented supplier quality management programs used or contemplated?
   Explain.

   _____

10. Are the above programs (if used) measured for effectiveness? How?

    _____

11. Is there a documented process control program in place?

    _____

12. Is the above program based on using statistical quality techniques?
    a. Control charts?
    b. Trend analysis?
    c. Process capability studies?
    d. Other? Explain.
       _____

13. If answers to 11 are no, explain basis of process control program today and what are future plans.

    _____

14. Is there a data collection system to quantify summary data for impact on:
    a. Product cost?
    b. Business performance?
    c. Customer satisfaction?

15. Is there a documented procedure to control and isolate nonconforming material?

    _____

16. Is there a documented and implemented closed loop corrective action process for both processes and parts?
    If so, include.

    _____

17. Is there a documented system for maintenance and calibration of test equipment?
    If so, include.

    _____

18. Is there an active and ongoing program to audit internal controls and procedures of the manufacturing operations?
    Explain.

    _____

19. If answer to 18 is yes, are the results of the program published and used as a basis of internal corrective action program?

    _____

20. What are the supplier's present outgoing quality levels (in PPM) for:
    a. electrical?

    _____-

    b. visual/mechanical?

    _____-

21. Is there a training policy that is documented and adhered to?

    _____

22. Is there a capability planning function that reviews the adequacy of the processes for every new part?

    _____

23. Are you on a "Ship to Stock" program with any of your Customers?
    If yes, what percentage (%) of your Customer are?

    _____

24. What is your company's position with regards to warranty/product liability?

    _____

    _____

    _____

25. Do you electrically test your product?

    _____

    If so, is it data-driven or self-learn?

    _____

    What percentage (%) is typically tested?

    _____

    What equipment do you have?

    _____

    Do you have capability for double-sided SMT Testing?

    _____

26. Do you perform Quality Audits after Final Inspection?

    _____

What corrective action is taken on nonconforming lots?

_____

Please comment.

_____

27. What is the average percentage (%) of Customer returns per month?

_____

28. What new Quality Program(s) have recently been implemented and have they/it benefited Quality, Production, or other?

_____

29. Is there a Quality Information System (QIS) reporting program in place?

_____

Is it automated?

_____

30. If a First Piece Inspection is performed, what is the frequency of follow-up inspections, if any; are they required to maintain tolerance?

_____

31. How is inspection test equipment maintained/calibrated?

_____

Outside laboratory?

_____

Supplier-owned facility?

_____

32. How often are measurement capability studies performed?

_____

33. Are your quality history records easily accessible, and how long are they maintained?

_____

34. How is material traceability controlled?

_____

Product traceability controlled?

_____

35. Do you identify manufactured parts with a lot code?

_____

36. Comment on your procedure for inspection of raw materials. Including identification, storage, isolation, and corrective action of nonconforming material?

_____

37. On an average, how many waivers are requested per month?

_____

Are they collated by department?

_____

Comment on corrective actions.

_____

38. Have you failed a vendor qualification in the past three (3) years?

_____

If yes, please comment.

_____

39. Comment on the following:

_____

What percentage of rejects are identified at incoming inspection?

_____

What percentage of rejects are found during in-process inspection?

_____

What percentage of products are rejected at final inspection?

_____

How frequently are quality audits performed?

_____

How frequently are equipment audits performed?

_____

How frequently are calibration audits performed?

_____

40. Do you have a completely documented and maintained process with provisions for temporary process changes?

_____

41. Could you comment on how your quality would benefit Digital's standards of excellence?

_____

APPENDIX A REFERENCED DOCUMENTS

A.1 EL-Class Digital Documents

EL-Class Number	Document Title
EL-00088-00	*DEC STD 088-0 Qualification Procedure for All Printed-Wiring Board Suppliers*

Use VTX SMC to order copies of EL-class documents from Standards and Methods Control. Send distribution questions to JOKUR::SMC or call DTN: 234-4423.

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